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September 23, 2010

Via USPS & email: <morrismailact@myfairpoint.net>

Gilbert Morris, Chair  
Town of Greenfield Planning Board  
PO Box 256  
7 Sawmill Road  
Greenfield, NH 03047

REF: Review of Florida Tower Partners Proposed Facility at 46 Zephyr Lake Road

Dear Mr. Morris:

I am a Radiofrequency ("RF") Engineer and a former communications site landlord. I built my first computer when I was 14 and a year later gained dial-up access to the Dartmouth College mainframe computer, employing it to calculate RF propagation. I obtained my first Federal Communications Commission ("FCC") license in 1965, and currently hold lifetime General Radiotelephone Certificate PG0111356. I am a 39-year Senior Member of the Society of Broadcast Engineers ("SBE"), Certified (#1098) as a Senior Broadcast Engineer since 1977; I have served as Vice-Chair and Secretary-Treasurer of the Boston Chapter. I am a 12-year Member of the Institute of Electrical and Electronics Engineers ("IEEE") and the IEEE Microwave Theory & Techniques Society. I worked on the most recent revision of Standard 356 for the Wave Propagation Standards Committee of the IEEE Antennas and Propagation Society. Well versed in propagation, collocation and interference issues, I am the Accredited FCC Frequency Coordinator for Part 74 spectrum below 2 Gigahertz in the State of Vermont. Over 44 years I have prepared numerous FCC applications and demonstrated extensive experience in RF design and analysis. The Vermont Environmental Board submitted my RF study results - crucial to tower permit decisions - to the FCC in two Rulemaking proceedings. The National League of Cities and the National Association of Telecommunications Officers and Advisors cited my comments in one of these FCC proceedings to support their reply comments. I authored the chapter on RF exposure prediction and measurement for the book "Cell Towers: Wireless Convenience? Or Environmental Hazard?" published in 2001 (ISBN 1-884820-62-X). I have submitted evidence and testified as a Radiofrequency Engineer before municipal bodies, and state and federal courts. I work primarily for municipalities reviewing wireless facility applications, and have not accepted wireless site-acquisition work from any provider for over ten years.

I have reviewed predicted-coverage maps and related supporting material for the above-referenced application. In summary, Florida Tower Partners' ("FTP") lead tenant AT&T Mobility ("AT&T") has a significant gap in its Greenfield coverage for which the proposed facility is a necessary solution. In addition, the provision for collocation will almost certainly be attractive to other providers.

I have the following observations:

1. As you know, last year I reviewed the application by AT&T for a facility in the northern part of Greenfield.<sup>1</sup> For the benefit of any new Planning Board ("Board") members, I will repeat some of the general comments I made at that time. Since then, developments at both the FCC and the U. S. Court of Appeals for the First Circuit have clarified how to address certain aspects of tower applications. The Telecommunications Act of 1996 ("TCA") continues to be the applicable federal legislation; it preempted some local regulation, although most land-use jurisdiction was specifically preserved by the Act for local bodies such as the Board. It is acceptable to require demonstration of need and to employ rigorous review, but the TCA requires action without undue delay. It forbids discrimination among providers or decisions that effectively prohibit personal wireless services.
2. Adequacy of other providers cannot be used as a reason to deny, since the TCA states that local "regulation...shall not prohibit or have the effect of prohibiting the provision of personal wireless services."<sup>2</sup> (Emphasis added.) An underlying basis for the TCA was to encourage service competition, a position underscored in late 2009 by the FCC when it stated that,  
"We [find] that where a State or local government denies a personal wireless service facility siting application solely because that service is available from another provider, such a denial violates Section 332(c)(7)(B)(i)(II). By clarifying the statute in this manner, we recognize Congress' dual interests in promoting the rapid and ubiquitous deployment of advanced, innovative, and competitive services, and in preserving the substantial area of authority that Congress reserved to State and local governments to ensure that personal wireless service facility siting occurs in a manner consistent with each community's values."<sup>3</sup>  
This is an important point, since it is not unusual to ask why, if another provider seems to have coverage, it is necessary to approve another facility.
3. The Board may hear concerns expressed by abutters about the application. According to the *Omnipoint v. City of Cranston* decision<sup>4</sup> by the U. S. Court of Appeals for the First Circuit,  
"As cell phone use increases, carriers need to build more facilities, especially in populated areas, to continue providing reliable coverage, and local regulations can present serious obstacles."<sup>5</sup> See *Sw. Bell Mobile Sys., Inc. v. Todd*, 244 9 F.3d 51, 57 (1st

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<sup>1</sup> "Review of New Cingular Wireless PCS, LLC d/b/a AT&T - Coverage Submissions for Proposed 515 Sawmill Road - AT&T Site #2472 (Greenfield East)" by Mark F. Hutchins; 7/12/09.

<sup>2</sup> 47 U.S.C. § 332(c)(7)(B) Limitations: (i)(II). The relevant language of TCA Section 704 is attached as Appendix 1.

<sup>3</sup> FCC WT Docket No. 08-165, "Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review, etc.", ¶71, 11/18/09

<sup>4</sup> *Omnipoint Holdings, Inc. v. City of Cranston*, 586 F.3d 38 (1st Cir. 2009); 11/3/09.

<sup>5</sup> Decision, Footnote 9: "Local authorities face what commentators call the 'not in my backyard' ('NIMBY') problem: property owners resist new facilities in populated areas because they find wireless facilities unsightly and worry facilities lower property values; yet as cell phone consumers these same people want quality service where they are most. E.g., D. Hughes, When NIMBYs Attack: The Heights to Which Communities Will Climb to Prevent the Siting of Wireless Towers, 23 J. Corp. L. 469, 482-83 (1998); S. Eagle, Wireless Telecommunications, Infrastructure Security, and the NIMBY Problem, 54 Cath. U. L. Rev. 445, 455-57 (2005). Residents often pressure town authorities to tighten and strictly enforce zoning restrictions on wireless facilities, creating numerous pockets of resistance for wireless carriers. Hughes, supra, at 470-71, 482-84."

Cir. 2001) ("[A]s Congress found, 'siting and zoning decisions by non-federal units of government [] have created an inconsistent and, at times, conflicting patchwork of requirements which will inhibit the deployment of [wireless technology] . . . ." (quoting Omnipoint Corp. v. Zoning Hearing Bd. of Pine Grove Twp., 181 F.3d 403, 407 (3d Cir. 1999) (second alteration in original))); J. Berger, Efficient Wireless Tower Siting: An Alternative to Section 332(c)(7) of the Telecommunications Act of 1996, 23 Temp. Envtl. L. & Tech. J. 83, 88 (2004). The themes in the TCA of promoting competition in the wireless communications market and of relatively speedily effectuating the purpose of the Act, including the elimination of significant gaps, underlie the determination of feasibility and impose their own constraints. Just as carriers must present evidence of their efforts to locate alternative sites, once they have done so there are limits on town zoning boards' ability to insist that carriers keep searching regardless of prior efforts to find locations or costs and resources spent."<sup>6</sup>

4. AT&T must adequately serve its FCC-licensed area, including the Town of Greenfield. According to the TCA, "the term 'personal wireless services' ["PWS"] means commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services."<sup>7</sup> The AT&T services are a subset of Commercial Mobile (Radio) Services which include the Cellular Radiotelephone Service, Broadband Personal Communications Service ("PCS"), and the Advanced Wireless Service ("AWS"). In 2000, BellSouth and SBC Communications combined their U. S. wireless operations to form Cingular Wireless which, in 2004, acquired AT&T Wireless; following several other mergers, the combined companies became part of AT&T, Inc. Also beginning in 2004, these combined wireless companies began deploying a third-generation ("3G") Universal Mobile Telephone System ("UMTS") with High-Speed Downlink Packet Access ("HSDPA"). Giving mobile customers high-speed Internet access, UMTS/HSDPA technology as implemented by AT&T utilizes both 800- and 1900-MHz spectrum - two bands originally licensed by the FCC to Cingular and AT&T Wireless. AT&T is utilizing its 1900-MHz PCS spectrum for Greenfield service.
5. In addition to space for AT&T, FTP proposes infrastructure for other providers, which is consistent with collocation encouraged by the Town Zoning Ordinance ("Ordinance").<sup>8</sup> Within the past year, the FCC has discussed utilization of additional spectrum, which should confirm to the Board that other providers are likely to desire facility placement to serve the Town:

"Wireless providers currently are in the process of deploying broadband networks which will enable them to compete with the services offered by wireline companies."<sup>9</sup> For example, Clearwire is deploying a next generation broadband wireless network for the 2.5 GHz band using the Worldwide Inter-Operability for Microwave Access

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<sup>6</sup> Omnipoint Holdings, Inc. v. City of Cranston, 586 F.3d 38 (1st Cir. 2009), p. 27-28; 11/3/09.

<sup>7</sup> 47 U.S.C. § 332(c)(7).

<sup>8</sup> Town of Greenfield Zoning Ordinance, Section V. Purpose and Intent; revised 3/9/10.

<sup>9</sup> FCC WT Docket No. 08-165, "Petition for Declaratory Ruling to Clarify Provisions of Section 332(c)(7)(B) to Ensure Timely Siting Review, etc.", Footnote 113, 11/18/09: "The Petitioner has submitted a study which asserts that approximately 23.2 million U.S. residents and 42% of road miles in the U.S. do not currently have access to 3G mobile broadband services. It further estimates that approximately 16,000 new towers will need to be constructed and 55,000 existing towers will need to be augmented for both Code Division Multiple Access (CDMA) and Global System for Mobile communications (GSM) 3G broadband services to be ubiquitous to U.S. consumers. CostQuest Associates, Inc., U.S. Ubiquity Mobility Study, April 17, 2008 at 4, filed as attachment to CTIA Ex Parte, GN Docket No. 09-51, WT Docket Nos. 08-165, 08-166, 08-167, 09-66 (filed Aug. 14, 2009)."

(WiMAX) technology.<sup>10</sup> Clearwire asserts that its WiMAX network will “provide a true mobile broadband experience for consumers, small businesses, medium and large enterprises, public safety organizations and educational institutions.”<sup>11</sup> Similarly, we expect that the winners of recent spectrum auctions will need facility siting approvals in order to deploy their services to consumers.<sup>12</sup> At least one Advanced Wireless Service (AWS) licensee with nationwide reach already is implementing its new network in the AWS band.<sup>13</sup>

As further indication of provider interest, I have been retained in the past 18 months to review applications in Antrim and Hancock, in addition to Greenfield. From these and other applications, I draw two important conclusions: First, PWS providers are anxious to close coverage gaps along principal highways such as Routes 31 and 136. Second, in-building residential and business service is increasingly viewed as essential. (See Footnote 9 on page 3.)

6. In addition to RF report, coverage maps and site plan submitted with the application, AT&T subsequently supplied data for the sites used to generate the maps. According to the site plan,<sup>14</sup> overall proposed structure height is proposed at 90' (feet) Above Ground Level (“AGL”); the maximum height allowed by the Ordinance is 140' AGL but no more than 20' above “Average Tree Canopy Height”.<sup>15</sup> Since the Federal Aviation Administration and the FCC consider height to be the highest point including attachments, topmost antennas need a center-line (“C/L”) height approximately 87' or 88' AGL to avoid increasing overall height. AT&T site-data spreadsheet coordinates appear to denote the site correctly, and are consistent with the location shown on both the site plan and my geo-referenced aerial photography. The site plan also shows results of a tree survey within a radius of approximately 150'. The Town tree-canopy definition differs from some other methods and is critical to consideration of this application, since AT&T seeks significantly greater height above the canopy than allowed. There are canopy considerations related to RF propagation that I will discuss later, and I find the definition and height limit problematic for several other reasons: First, averaging *all* trees over 20' in height may over-emphasize the impact of smaller trees that do not appreciably impact the tree line. Second, the 50-foot radius specified by the dimensional regulation is too small to accurately gauge the canopy; e.g., the Model Ordinance prepared several years ago by the Southwest Region Planning Commission used a more defensible 150-foot radius, which was also used by the applicant. Third, crown width is often a valid canopy consideration. Finally, no method is specified for the Board to consider any visual mitigation from hillside location.

<sup>10</sup> Ibid., Footnote 114, 11/18/09: “*Sprint And Clearwire To Combine WiMAX Businesses, Creating A New Mobile Broadband Company*, News Release, Sprint Nextel and Clearwire Corp., May 7, 2008 (“*Sprint/Clearwire News Release*”). See Sprint Nextel Corp. and Clearwire Corp., Applications for Consent to Transfer Control of Licenses, Leases, and Authorizations, WT Docket No. 08-94 and File Nos. 0003462540 et al., *Memorandum Opinion and Order*, 23 FCC Rcd 17570, 17619 ¶128 (2008) (approving Clearwire and Sprint Nextel’s plan to combine their 2.5 GHz wireless broadband businesses into one company).”

<sup>11</sup> Ibid., Footnote 115, 11/18/09: “*Sprint/Clearwire News Release*. Clearwire’s wireless broadband service is now available in 14 markets. *Clearwire Introduces CLEAR(TM) 4G WiMax Internet Service in 10 New Markets*, Press Release, Clearwire, Sept. 1, 2009.”

<sup>12</sup> Ibid., Footnote 116, 11/18/09: “*See Auction of Advanced Wireless Services Licenses Closes: Winning Bidders Announced for Auction No. 66*, Report No. AUC-06-66-F, *Public Notice*, 21 FCC Rcd 10521 (WTB 2006); *Auction of 700 MHz Band Licenses Closes: Winning Bidders Announced for Auction 73*, *Public Notice*, Report No. AUC-08-73-I (Auction 73), DA 08-595 (rel. Mar. 20, 2008).”

<sup>13</sup> Ibid., Footnote 117, 11/18/09: “*T-Mobile Comments at 2* (noting that unless it can expeditiously obtain approvals, its efforts to add high-speed services and expand coverage will be “significantly hampered”).”

<sup>14</sup> Site (NH1116-A) Plan Sheet Z4 - Elevation View & Details, dated 7/21/10.

<sup>15</sup> Town of Greenfield Zoning Ordinance, Section V. § E. Dimensional Requirements: 1.a. and 1.d.

7. The following coverage maps were submitted by the applicant:

- "RF Exhibit 1: Existing AT&T Coverage in Greenfield, NH",
- "RF Exhibit 2: Existing AT&T Coverage in Greenfield, NH w/Proposed Site at 87' C/L",
- "RF Exhibit 3: AT&T Network Plan",
- "RF Exhibit 4: Existing AT&T Coverage in Greenfield, NH w/Alternate Gould Hill Rd site",
- "RF Exhibit 5: Existing AT&T Coverage in Greenfield, NH w/Alternate Fletcher Rd site",
- "RF Exhibit 6: Terrain View",
- "RF Exhibit 6a: Height Analysis 138 feet", and
- "RF Exhibit 6b: Height Analysis 148 feet".

Adequate coverage has not been directly defined by Congress or in the FCC Rules and Regulations; the Greenfield Ordinance is silent in that regard. The wireless industry and some communities have defined adequacy between -96dBm<sup>16</sup> and -90dBm, generally referring to "on-street" service. AT&T stated in a previous review, that -105dBm level means "...that wireless coverage is too weak to hold a call, or non-existent."<sup>17</sup> If 10dB to 15dB (for fade/user losses) are added to a barely-adequate -105dBm, we can conclude that a level between -95dBm and -90dBm is adequate for on-street coverage. The AT&T maps use the yellow shading to denote an adequate on-street level of at least -92dBm. Note, however, that a -92dBm level in a yard or outside a vehicle will almost always result in a lower signal inside the vehicle and even less inside most buildings, due to greater signal losses compared with the outdoor environment. In its objection to the -95dBm adequacy level defined by the Town of Concord, MA, T-Mobile's predecessor stated in relevant part:

"For VoiceStream's network our receiver sensitivity specification for phone makers is -102dBm with 0 gain/loss at the antenna. Then 8db is accounted for with fading losses and 3dB is applied for head/body user loss. After factoring in the variables, this results in a value of -91dB[m] signal strength, which VoiceStream uses for on-street coverage."<sup>18</sup>

Allowing for additional loss explains why AT&T shows the -82dBm level (the blue shading) to indicate adequate in-vehicle coverage. This level is consistent with T-Mobile's use of -84dBm, which was affirmed in the City of Cranston decision.<sup>19</sup> Principal highways should at least have adequate in-vehicle coverage. Moreover, in 2005 the U. S. District Court for New Hampshire<sup>20</sup> confirmed the importance of in-building/in-home service:

"In evaluating the extent of a gap in coverage, courts have considered the availability of both in-vehicle and in-building service. See, e.g., Sprint Spectrum, L.P. v. Willoth, 176 F.3d 630, 643 (2d Cir. 1999). Therefore, the [Dunbarton] ZBA's conclusion, based on town counsel's representation, that in-home service was not pertinent for purposes of satisfying the requirements of the TCA was legal error and was also inconsistent with the evidence of record."<sup>21</sup>

<sup>16</sup> The dBm is a power level expressed as decibels ("dB") above one milliwatt. The dB is a logarithmic unit used to characterize a ratio (difference). In the case of RF power, if the second level is twice as much power as the first, it is 3dB higher; if the second level is ten times that of the first, it is 10dB higher; if the second is a million times the power of the first, it is 60dB higher. As can be seen, the use of decibels enables describing very large power ratios with modestly sized numbers. Note the use of negative numbers: -74dBm is 8dB stronger than -82dBm.

<sup>17</sup> Application letter to the Windsor, MA, ZBA on behalf of AT&T from Martin R. Cohen, Esq.; 12/10/08.

<sup>18</sup> "VoiceStream's Protest Memorandum Relative to §7.8.2.2. 'Adequate Coverage' as Defined in its Bylaw." Submitted to the Town of Concord, MA; 5/17/01.

<sup>19</sup> Omnipoint Holdings, Inc. v. City of Cranston, 586 F.3d 38 (1st Cir. 2009); 11/3/09.

<sup>20</sup> U.S.C.O.C. v. Dunbarton, 04-CV-304-JD; 04/20/05.

<sup>21</sup> Decision, Footnote 2: "It is true, however, that [w]here holes in coverage are very limited in number or size (such as the interiors of buildings in a sparsely populated rural area, or confined to a limited number of houses or spots as the area covered by buildings increases) the lack of coverage likely will be de minimis

The AT&T maps also utilize the strongest -76dBm (green shading) to indicate likely in-building (office, hotel and residential) coverage.

8. Considering the red and yellow areas, the maps show inadequate or barely adequate coverage of most of the Town of Greenfield. The Network Plan (RF Exhibit 3), which includes the proposed facility and activation of Site #2472 at 515 Sawmill Road, still would leave most of Route 31 south of Zephyr Lake without in-vehicle coverage. As can be seen in RF Exhibit 4, moving the proposed facility southeast to the top of Gould Hill would enable closing the Route 31 gap and provide in-building service to a much larger area adjacent to the highway. The Fletcher Road alternate site (RF Exhibit 5) does poorly, leaving part of Greenfield center without adequate coverage, as well as a section of Route 31 south of Greenfield center and Route 136 west into Peterborough. The RF Exhibits 6a and 6b show coverage expected from the proposed site with 140- and 150-foot towers, respectively. While 150' AGL would close virtually all of the highway coverage gaps, the 140' height appears to not quite allow clearance of Gould Hill in terms of coverage to the southeast. Remember that the applicant is only seeking a 90' AGL structure; at this height, another facility will be necessary to close coverage gaps between Gould Hill and Site #1555 in Lyndeborough. In terms of town-wide coverage, this would leave an area to the northwest that presumably could be served if the tower currently under consideration in Hancock is approved.

9. For corroborating analysis I employed the widely accepted Okumura<sup>22</sup> RF propagation model, with high-resolution terrain data, to spot-check coverage.

"The Okumura approach is probably the most widely quoted of the available models. It takes into account not only urban, suburban, and rural environments, but also describes the effects of different kinds of terrain. All phenomena and effects can be computed well in practice."<sup>23</sup>

An empirical model with decades of utilization and refinement, Okumura performs pertinent reliability factoring, which takes into consideration seasonal variation due to foliage. My calculations at several points largely agree with AT&T modeling. At the Routes 31/136 junction, for example, my Okumura 95% modeling predicts -101.2dBm, which is consistent with the AT&T predictive shading range of -104dBm to -92dBm. At 650 Greenfield Road, just beyond the edge of AT&T -82dBm shading from the Peterborough Site #1552 Beta sector, Okumura predicts -83.9dBm. Therefore, I conclude that the AT&T methods and maps give a credible representation of its PCS coverage.

10. I examined the submitted Site Search and conclude that the nearest AT&T facilities are unable to be adjusted to provide the needed coverage. Mostly this is due to the facilities being too far away, but much of the inadequate coverage area is wooded and/or otherwise blocked by terrain. Vegetation negatively impacts RF propagation and, although signals that graze treetops and blocked paths do not mean affected areas will have no communication, ideally this will be mitigated by careful (usually higher) antenna placement closer to the problem area. AT&T utilizes higher-frequency 1900MHz spectrum, where terrain and foliage impact will be even more severe than is the case

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so that denying applications to construct towers necessary to fill these holes will not amount to a prohibition of service.' *Willloth*, 176 F.3d at 643-44. In this case, the ZBA rejected all evidence of gaps in service to homes and did not find that any such gaps were merely *de minimis*."

<sup>22</sup> "Field Strength and Its Variability in VHF and UHF Land-Mobile Radio Service," Yoshihisa Okumura, et al., *Review of the Electrical Communications Laboratory*, Vol. 16, No. 9-10, Sept.-Oct., 1968.

<sup>23</sup> *Radio Propagation in Cellular Networks*, p. 261; Nathan Blaunstein, Ph.D.; Artech House Publishers, 2000.

with conventional 800MHz cellular. Scientist Henry L. Bertoni cites the research of Vogel and Goldhirsh<sup>24</sup> when he writes that “[t]he leaves and branches of trees offer significant attenuation to UHF and microwave signals. Measurements of transmission loss at 869MHz for low elevation angles through the canopies of large isolated trees found attenuations of 10 dB and more.”<sup>25</sup> Since foliage will exacerbate losses from locating antennas at a lower height, overall height and other collocation provider levels should be considered. Keeping in mind the deleterious impact of foliage, here is the advice in one engineering text: “Antenna height clearance, as a rule of thumb, is fifteen feet above clutter.”<sup>26</sup> Hindering our ability to quantify the effect of moving antennas close to trees is the seasonal change in foliage. According to one of the foremost authorities on the subject, William C. Y. Lee, “In summer the foliage is very heavy, but in winter the leaves of the oak and maple trees fall and the pine leaves stay. In addition, when the length of pine needles reaches approximately 6 in., which is the half wavelength at 800MHz, a great deal of energy can be absorbed by the pine trees.”<sup>27</sup> I have recently reviewed several applications submitted by Clearwire for WiMAX services that use even higher 2600MHz spectrum. This is in addition to possible interest by other personal wireless providers, so there will almost certainly be demand for antenna placement at this site - and all antennas require adequate foliage clearance. Using the standard 10-foot antenna vertical separation allowance for each set of provider antennas, the proposed bottom-most (third) provider C/L height of 67’ AGL raises the concern that there may not be ideal tree-canopy clearance for additional collocation providers.<sup>28</sup>

11. The FCC Rules and Regulations address RF interference, primarily between licensees. Interference is unlikely beyond the calculated blanketing zone which is just a few feet for the power levels anticipated, although it is impossible to state with certainty that there will never be interference to nearby electronic equipment. Nonetheless, the Town’s authority to regulate interference was effectively preempted by the refusal of the U. S. Supreme Court in 2000 to hear the Freeman case.<sup>29</sup> In addition, licensees must comply with FCC RF radiation exposure requirements for the general population, as well as for any employees and contractors who have access to the antennas. The proposed antenna height(s) will result in ground-level exposure significantly below FCC Maximum Permissible Exposure (“MPE”), even with activation of collocation providers. (These assumptions are addressed by the Local Official’s Guide<sup>30</sup> published by the FCC.) Note that if we were to directly face one of the proposed transmitting antennas, MPE would be exceeded only within 5 or 10 feet. This means that exposure levels -

<sup>24</sup> W. J. Vogel and J. Goldhirsh, Tree Attenuation at 869 MHz Derived from Remotely Piloted Aircraft Measurements, *IEEE Trans. Antenna Propagation*, vol. AP-34, pp. 1460-1464, 1986.

<sup>25</sup> Henry L. Bertoni, Ph.D., *Radio Propagation for Modern Wireless Systems*, ¶7.3 Modeling the Effects of Trees; Prentice Hall, 2000.

<sup>26</sup> Kyoung Il Kim, Ed., *Handbook of CDMA System Design, Engineering and Optimization*, A.4.1 Candidate Site Selection; Prentice Hall, 2000.

<sup>27</sup> William C. Y. Lee, *Mobile Cellular Telecommunications*, 2<sup>nd</sup> Edition, ¶4.4 Foliage Loss; McGraw-Hill, 1995.

<sup>28</sup> See Site (NH1116-A) Plan Sheet Z4 - Elevation View & Details, dated 7/21/10.

<sup>29</sup> Freeman, et al., v. Burlington Broadcasters, Inc. et al., Petition for Writ of Certiorari to the U. S. Court of Appeals for the Second Circuit; denied October 2, 2000.

<sup>30</sup> *A Local Official’s Guide to Transmitting Antenna RF Emission Safety: Rules, Procedures, and Practical Guidance* (June 2, 2000), available at [http://wireless.fcc.gov/siting/FCC\\_LSGAC\\_RF\\_Guide.pdf](http://wireless.fcc.gov/siting/FCC_LSGAC_RF_Guide.pdf) (The LSGAC is a body of elected and appointed local, State, and tribal government officials appointed by the Chairman of the FCC. It provides advice and information to the Commission on key issues that concern local and State governments and communicates State and local government policy concerns regarding proposed Commission actions.)

even at greater heights due to the ground elevation east and southeast of the site - will still be substantially below the FCC guideline MPE. Therefore, accessibility and restrictive measures are necessary for FCC compliance. Beyond addressing accessibility, the Board cannot regulate the placement of the facility based on "environmental" or health concerns, although it can seek demonstration of compliance using guidelines of the FCC Office of Engineering Technology Bulletin 65.

12. I would like to review my conclusions:

- a.) AT&T has shown substantial gaps in its Greenfield coverage for which the proposed facility is a reasonable solution.
- b.) Independent propagation modeling has corroborated the validity of AT&T mapping and coverage claims.
- c.) AT&T has demonstrated that existing sites cannot provide a viable solution.
- d.) Although less than ideal, the proposed 90-foot height, in conjunction with existing and planned facilities, will enable closing coverage gaps in the Greenfield center area and along most of Routes 31 and 136. Coverage is clearly compromised by locating antennas closer to the trees, so another facility will be required to fill in coverage southeast of Gould Hill.
- e.) The proposed allowance for collocation makes it less likely there will be tower proliferation, since most personal wireless service providers face the same technical challenges and customer expectations.
- f.) AT&T will comply with FCC RF exposure guidelines, assuming antenna access is properly restricted.

Please let me know if you have any questions or need additional information.

Sincerely,

[ORIGINAL SIGNED]

Mark F. Hutchins

## APPENDIX 1

Section 704 of Telecommunications Act of 1996: Text from 47 U.S.C. § 332(c)(7)

### (7) PRESERVATION OF LOCAL ZONING AUTHORITY.

(A) GENERAL AUTHORITY. Except as provided in this paragraph, nothing in this Act shall limit or affect the authority of a State or local government or instrumentality thereof over decisions regarding the placement, construction, and modification of personal wireless service facilities.

#### (B) LIMITATIONS

(i) The regulation of the placement, construction, and modification of personal wireless service facilities by any State or local government or instrumentality thereof

(I) shall not unreasonably discriminate among providers of functionally equivalent services; and

(II) shall not prohibit or have the effect of prohibiting the provision of personal wireless services.

(ii) A State or local government or instrumentality thereof shall act on any request for authorization to place, construct, or modify personal wireless service facilities within a reasonable period of time after the request is duly filed with such government or instrumentality, taking into account the nature and scope of such request.

(iii) Any decision by a State or local government or instrumentality thereof to deny a request to place, construct, or modify personal wireless service facilities shall be in writing and supported by substantial evidence contained in a written record.

(iv) No State or local government or instrumentality thereof may regulate the placement, construction, and modification of personal wireless service facilities on the basis of the environmental effects of radio frequency emissions to the extent that such facilities comply with the Commission's regulations concerning such emissions.

(v) Any person adversely affected by any final action or failure to act by a State or local government or any instrumentality thereof that is inconsistent with this subparagraph may, within 30 days after such action or failure to act, commence an action in any court of competent jurisdiction. The court shall hear and decide such action on an expedited basis. Any person adversely affected by an act or failure to act by a State or local government or any instrumentality thereof that is inconsistent with clause (iv) may petition the Commission for relief.

#### (C) DEFINITIONS.-- For purposes of this paragraph

(i) the term "personal wireless services" means commercial mobile services, unlicensed wireless services, and common carrier wireless exchange access services;

(ii) the term "personal wireless service facilities" means facilities for the provision of personal wireless services; and

(iii) the term "unlicensed wireless service" means the offering of telecommunications services using duly authorized devices which do not require individual licenses, but does not mean the provision of direct-to-home satellite services (as defined in section 303(v)).